

NASA Stennis Space Center Environmental Resources Document

7.0 Solid and Hazardous Waste Generation, Treatment, Storage and Disposal

The Resource Conservation and Recovery Act (RCRA) was enacted to regulate all aspects of solid and hazardous waste management from generation to ultimate disposal. The Mississippi Department of Environmental Quality (MDEQ) administers nonhazardous and hazardous waste programs, as well as the waste reduction/waste minimization program.

SSC generates solid and hazardous waste from its research and development operations, laboratories, instrument repair, and operations and maintenance functions. SSC generates solid waste consisting of household-type wastes and nonhazardous industrial waste, which are disposed of on-site in a State-permitted solid waste landfill. SSC also generates hazardous waste, which is transported off-site for treatment, storage, and disposal. NASA maintains large quantity generator (LQG) status under RCRA subtitle C for generating hazardous waste and having it transported off-site for treatment, storage or disposal. Six agencies at SSC have small quantity generator (SQG) status, four of which are classified as "Conditionally Exempt". The SQGs include the Naval Oceanographic Office (NAVO); the Naval Research Labs (NRL); the National Oceanographic and Atmospheric Administration National Data Buoy Center (NOAA/NDBC); the University of Southern Mississippi Center for Marine Sciences (USM); the United States Geologic Survey (USGS); and the U. S. Environmental Protection Agency (EPA).

SSC complies with MDEQ requirements for waste minimization. SSC maintains on-going recycling programs and identifies hazardous materials for which less hazardous substitutes are available.

Section 313 of the Emergency Planning and Community Right-to-know Act (EPCRA) requires annual reporting of toxic chemical releases (TRI) and maximum storage quantities (Tier II). SSC reporting for 1999 indicates that there were no releases of listed chemicals above reportable quantities for TRI purposes. Site chemicals meeting the criteria for reporting were below the 10,000-pound threshold quantity. SSC reporting for 2000 indicates that some of the chemicals on-site are stored in quantities that require reporting for Tier II purposes. The SSC Fire Department, LEPC, and MEMA were sent a letter regarding SSC's reporting status.

SSC has an ongoing program to investigate and remediate potential historical spills, releases, and disposal incidents under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA). Section 120 of CERCLA as amended by SARA mandated that EPA establish a "docket", or listing, of

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Federal facilities where hazardous waste has been generated and/or stored, treated or disposed of in the past. Although SSC has not been listed as a CERCLA facility, NASA has taken a proactive approach to investigate areas that may have been impacted by historical releases.

7.1 Nonhazardous Solid Waste

RCRA defines the term "solid waste" to mean "any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material." The key word in this definition is "discarded," which EPA has construed to cover certain materials that are used, reused, recycled, or reclaimed. Federal guidelines for Land Disposal of Solid Waste are given in 40 CFR §241. The State of Mississippi adopted Nonhazardous Waste Management Regulations on September 23, 1993.

7.1.1 Generation

Non-hazardous wastes generated at SSC (which are not segregated for recycling) are collected in dumpster-type containers located throughout the Fee Area. The containers are emptied once per day, three days a week, and the solid wastes are transported to the on-site sanitary landfill for disposal. Non-hazardous solid waste is not shipped off-site for disposal; however, off-site contractors handle the recycling of some paper products.

7.1.2 Disposal in the Fee Area

Solid waste generated within the Fee Area at SSC is disposed on-site in a sanitary landfill under the authority of Permit No. SW02401B0376 issued by the MDEQ, Office of Pollution Control. The landfill receives on-site garbage and nonhazardous industrial waste. The 2000 average quantity of solid wastes accepted for disposal in the landfill was approximately 6,000 lbs per month (16). The current permit was issued January 10, 1995 and remains in effect until January 10, 2005.

The landfill consists of and is inclusive of an approximate area of 21 acres (0.09 square kilometers), which was closed in 1997, and two new cells that were opened in September 1996. The new cells, which have a composite liner system, leachate collection and treatment system, and storm water pond, satisfy the requirements in the 1993 State of Mississippi Nonhazardous Waste Regulations. The total area of the two new cells is 77.5 acres (0.31 square kilometers). The larger, or primary cell, handles

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all material except asbestos containing materials; the second smaller cell is used to dispose of asbestos containing materials and other materials when the larger cell is not accessible.

There is also a closed landfill that was permitted by MDEQ (Permit No. SW02401A0358) that is situated southeast of the current landfill (13). This inactive landfill was closed in accordance with the Mississippi Nonhazardous Waste Management Regulations. Groundwater is monitored semiannually per the groundwater-monitoring plan that is submitted to MDEQ.

SSC maintains five permitted Class II rubbish disposal sites. Three of these sites are for harvested vegetation from the three SSC wastewater treatment lagoons (Certificate # R2-035) and one demolition debris (Certificate # R2-036). (Plant harvesting is dependent on growth rates but usually occurs twice per year.) The fifth rubbish site is under the MDEQ General Permit for disposal of asphalt, stone, brick, mortar, natural vegetative materials, and unpainted, untreated wood debris. The first four of these rubbish sites are certificates of cover. The latter is actually a permit with an expiration date of January 14, 2007.

7.1.3 Disposal in the Buffer Zone

Two closed landfill sites are located in the Buffer Zone, the Catahoula Landfill and the Pearl River County Landfill. The Catahoula Landfill is a 28.5-acre (0.12 square kilometer) site located on lands owned by NASA in Section 3, Township 7 South, Range 15 West, Hancock County, Mississippi. An undated paper issued by NASA gives the date for the Catahoula Landfill's original permit to operate as September 1977 (10). This paper mentions an Environmental Assessment (EA) that was completed in 1977 by the Mobile District, U.S. Army Corps of Engineers with a Finding of No Significant Impact (FONSI) for the site. The site had always been operated by Hancock County, and NASA never contributed waste material to the landfill (10). The landfill was permitted for operation in October 1981, and permitting was discontinued in December 1988. The closure plan for this landfill was issued in February 1989 and five groundwater-monitoring wells were installed at that time (1).

The Pearl River County Landfill operated in the Buffer Zone on tract No. 4756. According to an undated paper issued by NASA, the site appears to have opened in the late 1970s without obtaining a permit (11). The Mississippi Board of Health gave the City of Picayune approval to operate the landfill as an area fill in 1978. The site was operated initially by the City of Picayune and subsequently by Pearl River County. An EA for expansion of the landfill conducted by the Mobile

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District, U.S. Army Corps of Engineers was made final on February 5, 1981, and resulted in a FONSI (2). The expansion studied for this EA was never implemented. The area used comprises approximately 8 acres (0.03 square kilometers) and operated as a trash or rubbish fill (inert materials only) and as a transfer facility for household garbage. NASA never contributed any materials to the site (11). This landfill was permitted as a rubbish fill area and was closed in 1992. The MDEQ does not require a closure plan.

7.2 Hazardous Waste

Subtitle C of RCRA regulates the generation, transport, treatment, storage, and disposal of hazardous wastes. The RCRA hazardous waste management program regulates materials defined as "hazardous waste." RCRA defines "hazardous waste" as a subset of the broader category of "solid waste". Therefore, a material cannot be a RCRA hazardous waste unless it is first a RCRA solid waste. In this regard, a solid waste will be deemed a hazardous waste if it meets the definition of a hazardous waste in 40 CFR 261.

The MDEQ administers the regulations for treatment, storage, disposal and transportation of hazardous waste.

7.2.1 Generation

All hazardous waste generators at SSC are subject to the RCRA requirements in 40 CFR § 262. NASA is the only classified Large Quantity Generator (LQG) at SSC. Six resident agencies are classified as Small Quantity Generators (SQGs) and maintain their own EPA identification numbers. Table 7-1 summarizes the RCRA identification numbers and status for NASA and resident agencies at SSC. NASA will continue to assist in the reporting of information to EPA, but NASA will not be responsible for RCRA compliance for its resident agencies. The following information illustrates the types of hazardous wastes generated at SSC.

Hazardous Waste Generation Processes - The following processes or activities generate hazardous wastes at SSC:

- Research/development and analytical testing generate wastes such as spent solvents, reaction products, unused or expired reagents, acids, bases, and test sample wastes.

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- Facility maintenance generates a variety of materials including paints, solvents, and spent abrasive blast material that may contain heavy metals.
- Construction generates a variety of wastes including spent solvents, acids and bases, paint waste with heavy metals, ignitable wastes and vehicle maintenance wastes.
- Aerospace testing, cleaning, and maintenance generate spent cleaning solutions, dyes, and photographic wastes.
- Equipment cleaning/degreasing generates alkaline cleaners, nitric acid, and trichloroethylene.
- Photographic processes generate various process bath wastes.

7.2.2 Treatment, Storage and Disposal

Hazardous wastes generated at SSC are managed according to the RCRA pre-transport requirements at 40 CFR 262.34. All hazardous wastes placed in the accumulation area must be shipped off-site for treatment, storage, or disposal within 90 days from the start date of accumulation (satellite accumulation areas are not subject to the 90 day rule). Annually, NASA conducts independent audits of the treatment, storage, and disposal (TSD) facilities it uses. A list of the TSD facilities used by NASA is available from NASA Environmental Management

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Table 7-1
RCRA ID Numbers and Status for
NASA and Resident Agencies at SSC

ID Numbers	Generator	Status	Building
MS6801200001	U.S. Geological Survey	Conditionally Exempt SQG	2101
MS2800090001	NASA John C. Stennis Space Center	LQG	1100
MS6171624640	Naval Oceanographic Office	SQG	1002A
MS0000444745	USM Center for Marine Sciences	Conditionally Exempt SQG	1103
MS5171624641	Naval Research Lab	Conditionally Exempt SQG	1000/1009
MS7801200000	U.S. Environmental Protection Agency	Conditionally Exempt SQG	1105
MS2130500000	NOAA National Data Buoy Center	SQG	3203, 3205

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7.3 Waste Minimization

Congress established a national policy that the generation of hazardous waste be reduced or eliminated wherever feasible. Two requirements designed to help implement the national "waste minimization" policy were added to the RCRA regulatory requirements. First, § 3002(a)(6) requires hazardous waste generators, in their Biennial Reports, to identify efforts undertaken to reduce the volume and toxicity of hazardous waste generated and to report on the actual changes in volume and toxicity of waste achieved. In the second provision, RCRA § 3002(b), Congress required that all generators provide the following certifications on each hazardous waste manifest:

- The generator "has a program in place" to reduce the volume, quantity, and toxicity of the waste covered by the manifest; the degree of these reductions will be determined by the generator based on economic practicality.
- The method of waste management proposed in the manifest is the most practical method currently available to the generator for minimizing the present and future threat to human health and the environment occasioned by the waste.
- Generators making the required certification must ensure that they do, in fact, have a waste minimization program in place or risk potential enforcement consequences for false certification.

SSC has a waste minimization program that involves hazardous product substitution, waste stream segregation, material-handling improvement, alterations in production scheduling, and increased recycling activities. SSC presently recycles Freon, mercury, cardboard, used tires, batteries, paper, used oil, and scrap metal. Substitution of less toxic or non-hazardous materials has been accomplished in several instances. A new ventilation system has been installed for the clean line operations to minimize solvent evaporation. SSC also has an ongoing program to evaluate the use of solvents/degreasers in parts washers, with the goal of finding suitable alternative solvents, which will reduce adverse environmental impacts and employee exposures. Recent efforts include the Fluid Component Processing Facility (FCPF) migrated in December of 2000 from Freon 113 to HCFC-225g for Cleaning Verification. HCFC-225g is a SNAP approved alternative to Freon. All existing ventilation and distillation systems can currently handle either solvent. The HCFC-225g is actually a blend of the 225a and 225b isomers and shows to have a significant reduction in ozone depleting potential. The SSC-STD 79-001 (Cleanliness Requirements for SSC Systems) has been modified to

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allow use of HFCF-225g for Cleaning Verification (a.k.a. precision cleaning) of LOX/GOX systems at SSC. In addition, the FCPF began, in 2000, to use an aqueous parts washer in lieu of the 1,1,1 Trichloroethane vapor degreaser. The degreaser is still operational and used infrequently. The aqueous washer handles the vast majority of component part degreasing.

Stennis Space Center recycles office/copier paper and computer paper through paper recyclers. Other materials such as metals, oils, and batteries are handled through other brokers at no or minimal cost to SSC. Additionally, Hancock County has provided recycling containers for resident agencies usage for items such as newspaper, opaque plastic, glass, and cardboard. Metal drums that can not be reconditioned are crushed and collected for scrap metal. The amount of non-hazardous solid waste recycled by SSC is summarized in Table 7-2.

7.4 CERCLA Hazardous Material Release Reporting

7.4.1 Regulatory Requirements

Hazardous material release reporting is required for contractors and resident agencies at SSC under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, or commonly known as Superfund) and under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986. CERCLA requires hazardous substance releases exceeding certain threshold values to be reported. Executive Order #12580 requires Federal facilities to comply with the contents of the law.

7.4.2 SSC Release Reporting

Emergency response requirements under the CERCLA apply to the operation of SSC. Under CERCLA, NASA, the resident agencies, and the contractors at SSC are responsible for reporting releases of reportable quantities (RQ) of hazardous substances to the National Response Center within 24 hours. Reportable quantities are specified on a constituent-by-constituent basis in 40 CFR 302.4.

SSC implements this program through Stennis Procedures and Guidelines (SPG) 1040.1, which provides a comprehensive emergency plan. This plan includes procedures for eight types of emergencies including one for fires and explosions and one for spills of oil and hazardous substances. The plan was revised in 2000 and is written to meet OSHA, EPA, and NASA requirements, including

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the procedures to report accidental spills of hazardous chemicals and toxic substances in excess of RQs listed at 40 CFR 302.4.

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Table 7-2
2000 SSC Non-Hazardous Solid Waste Recycling

Material	Quantity
White Paper	142,728 lbs
Mixed Paper	76,520 lbs
Cardboard	44,000 lbs
Batteries	3,100
Tires	0 units
Waste Oil	9,767 gallons
Toner Cartridges	1,171 units
Scrap Metal	754,432 lbs

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NASA/SSC has complied with annual reporting requirements of SARA. NASA has not submitted MSDSs to the LEPC (per their request), but a chemical listing was provided. MSDSs are made available to the SSC Fire Department.

Toxic chemical releases are reported by SSC as required by Section 313 of EPCRA. This information is submitted on EPA Form R annually by July 1. NASA prepares the Toxic Release Inventory (TRI) report, which is required to provide the public with information on the release of toxic substances to the environment in the reporting year. Facilities must report the quantities of both routine and accidental releases of listed chemicals, if the substance usage exceeds the reportable quantity as specified in 40 CFR 302.4. No releases were reported for CY 1999, included as Appendix E-1 (15).

Section 313 of EPCRA also requires reporting of the maximum quantities of listed chemicals stored on-site during the reporting year, if the threshold quantities are exceeded. SSC's 2000 Tier Two report (included as Appendix E-2) lists 1,1,1 trichloroethane, chlorine, hydrogen peroxide, liquid hydrogen, liquid oxygen, nitric acid, and sodium hydroxide (18).

7.4.3 CERCLA Investigation Activities

SSC is conducting the investigation and clean up of various sites where historical spills, releases, and disposal incidents occurred. Section 120 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) mandated that EPA establish a "docket", or listing, of Federal facilities where hazardous waste has been generated and/or stored, treated or disposed of in the past. Although SSC has not been listed as a CERCLA facility, NASA is taking a proactive approach to investigate areas that may have been impacted by historical releases.

Under the CERCLA site investigation process, the first step involved conducting a Preliminary Assessment (PA) to determine whether or not further investigation was warranted. Preliminary Assessments were conducted for forty sites at SSC. Twenty-six of these sites were found to be clean or to have contamination that could be easily removed. In the latter case, most of the contaminated media has been removed. Fourteen sites required additional investigation where the sampling of various media (i.e. soil, groundwater, surface water) for contamination has been or will be conducted. Of the fourteen sites, nine sites have been designated as Clean Up Areas A through I, four sites are potential "no further action" (NFA) sites, and one is a long-term monitoring site. Remedial systems

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are being installed at five of the nine Clean Up Areas. The remaining four Clean Up Areas are undergoing various stages of the Remedial Investigation/Feasibility Study (RI/FS). Once the RI/FSs are complete and the extent of contamination is determined at these sites, an evaluation of potential risks and the feasibility of soil and groundwater clean-up options will be made (17).

7.5 Major Environmental Considerations for Proposed Actions

All construction and testing operations must be coordinated through NASA Environmental Management so that environmental impacts can be properly assessed. Contact with NASA Environmental Management is encouraged to ensure that no proposed actions jeopardize compliance with NEPA or any other environmental regulations. Additionally, contact should be made with NASA Environmental Management for assistance in making any environmental determinations.

7.6 Memberships

The NASA Environmental Officer is a member of the Hancock County Local Emergency Planning Committee.

7.7 References

1. Compton Engineering, P.A., 1989, Closure Plan for the Catahoula Landfill.
2. Mobile District Corps of Engineers, 1988, Environmental Assessment, Pearl River County Landfill.
3. NASA, SSC, 2000 Hazardous Waste Report for Stennis Space Center, USEPA Form 1C.
4. U.S. Geological Survey, SSC, 2000 Hazardous Waste Report, USEPA Form 1C.
5. Naval Oceanographic Office, SSC, 2000 Hazardous Waste Report, USEPA Form 1C.
6. University of Southern Mississippi, Center for Marine Sciences, SSC, 2000 Hazardous Waste Report, USEPA Form 1C.
7. Naval Research Laboratory, SSC, 2000 Hazardous Waste Report, USEPA Form 1C.

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8. U.S. Environmental Protection Agency, SSC, 2000 Hazardous Waste Report, USEPA Form 1C.
9. NOAA National Data Buoy Center, SSC, 2000 Hazardous Waste Report, USEPA Form 1C.
10. NASA, undated, Buffer Zone Hancock County Site History.
11. NASA, undated, Buffer Zone Pearl River County Site History.
12. NASA, SSC, 1994 Industrial, Commercial, and Institutional Non-Hazardous Solid Waste Generator Survey.
13. State of Mississippi, 1985, Solid Waste Management Permit No. SW02301A0358.
14. State of Mississippi, 1995, Solid Waste Management Permit No. SW02401B0376.
15. NASA, SSC, 1999 Toxic Release Inventory Report.
16. NASA, SSC, 2000 Landfill Log Summary.
17. NASA, SSC, CERCLA Fact Sheet Number 7.
18. NASA, SSC 2000 Tier Two Emergency and Hazardous Chemical Inventory.